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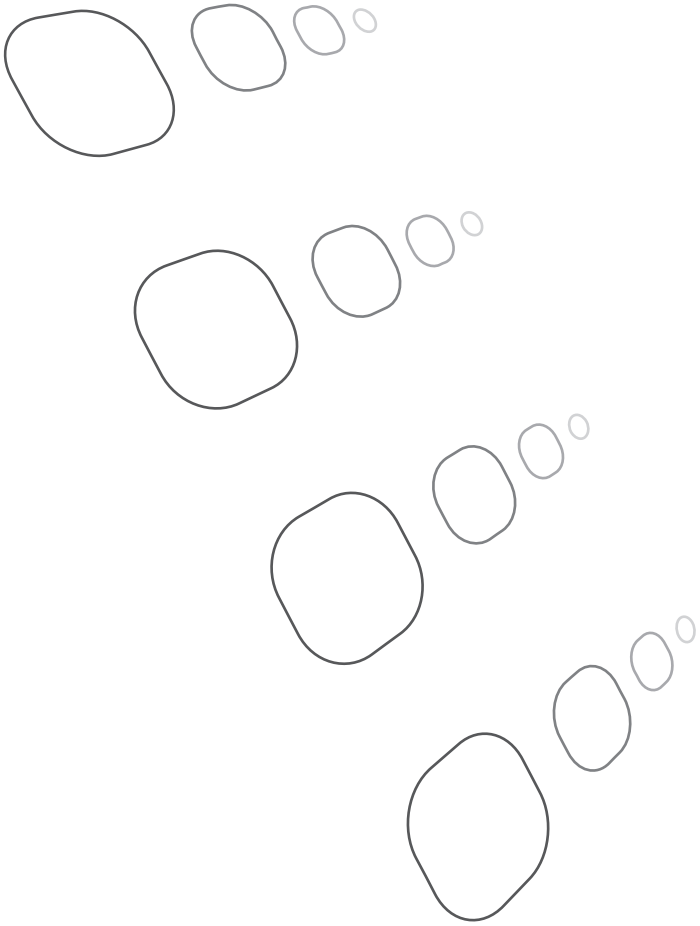

Stereo3D

User Guide

Version 5.2

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This manual is not product specific and may detail features that are not available on all systems.

This manual is revision C

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Information: Additional hardware or software information which may be useful.

Tips: Useful hints and advice when undertaking tasks.

Notes: System, software and workflow points to consider and remember.

See: Reference to other items in this document or in other documents.

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<Text> in these brackets represents a specific key press on the keyboard.

Text in italics represents a menu function or an option. An upper case first letter indicates a main menu and a lower case first letter indicates a sub-menu.

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About This Manual

This guide covers software available on some Quantel standalone and server connected systems. It may cover functions or options not available on the system you are using.

This guide was written and published by Quantel. The bottom of each page displays the guide's reference number, eg **2116-59-040** plus a revision letter eg **E** ('E' being more recent than 'A' which is the original). The publish date is also indicated in the format **mm/yy.** If you require hard copies of a guide, always quote its reference number, revision letter and title.

2140-57-008

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C	**08/12**	**E44679**	**5.2**

Helpdesk & Web Support

24 Hour Helpdesk
tel +44 (0)1635 38508* *fax* +44 (0)1635 815892
email 24hour.support@quantel.com

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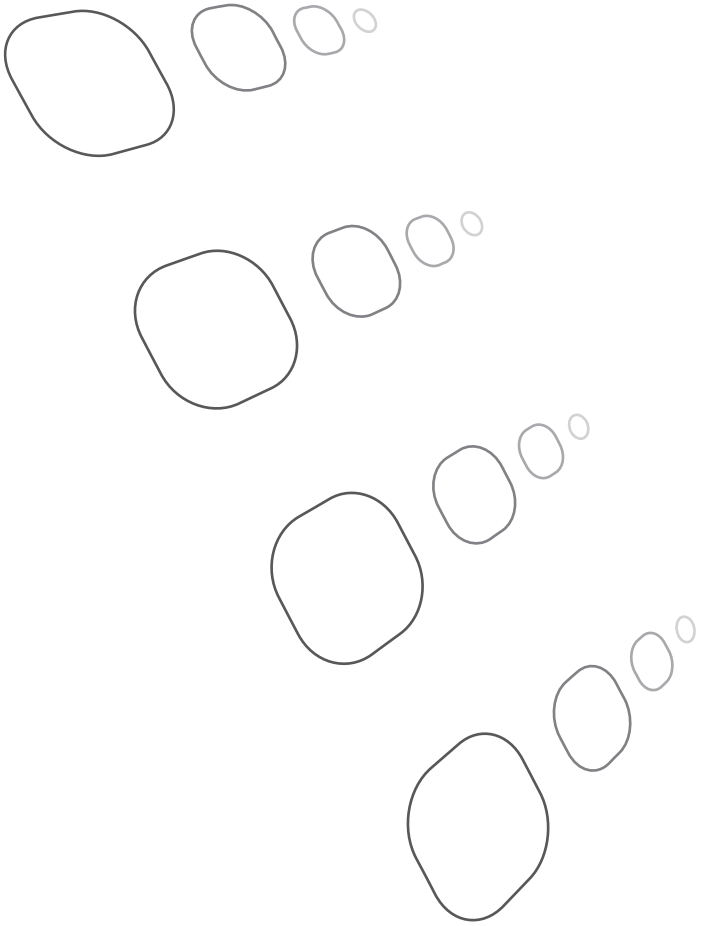

1

Stereo GUI

Quantel's Stereo3D functionality allows stereo media to be ingested, adjusted, previewed and played-out.

Editing, stereo and colour correction tools provide a complete stereo post production environment.

Overview

This guide is for use only after the user has a thorough understanding of Quantel's I/O and Edit applications together with MLT FX. See the I/O, Editing, MLT FX and Grading User Guides for details.

Upgrading Versions – Important Notice

V5.2 does not support previous Stereo3D clips with the Effects application's history – these clips cannot be converted to the new Stereo3D multilayer timeline.

Before upgrading, ensure any current work involving Stereo3D clips with Effects history is complete and clear any existing Effects history.

You cannot migrate back to V.5.1 because of database changes.

Post & DI Functionality

Quantel's Stereo3D functionality allows stereo media to be ingested, edited, have processes applied (eg colour), then be previewed and played-out via the Quantel workstation.

As with mono (2D) media, the I/O application provides ingest, conform, export, play-out and archive functions. The Edit application can be used to initially edit clips, then by opening MLT FX, you can set-up processes such as colour, key, dve, blur etc and use the 'stereo' process functions to assist with stereo specific functions such as convergence or push.

Broadcast Functionality

The Stereo3D option available on specific Quantel seats (including Qube, sQ Play, sQ Record etc) allows stereo media to be ingested via the sQ Server, viewed, edited (with MLT FX processes), published, then played-out via the sQ Server.

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Stereo media can be published from the desktop or timeline to the sQ Server and played-out live to a 3D TV using sQ Play. The server can play-out separate left and right eyes on 2 allocated HD-SDI ports, or multiplex them together onto a single HD-SDI stream. sQ Play can control 1 or 2 stereo port pairings.

sQ seats can use the Intelligent Archive Power Portal with stereo media.

Note that the One Shot (F8) Menu and Templating option are not available with stereo media on sQ seats.

See sQ Record User Guide for stereo ingest details.
See sQ Play User Guide for stereo play-out details.
See sQ & ISA System Guide for stereo server & workflow details.

Converting Previous Stereo Clips

GUI Prompt

When you launch the Quantel kernel and there are clips that are a previous version's stereo (ie before V5.2) an error message pops-up on the right of the display:

If you press *OK* to close the pop-up and do not now convert clips (see following sections), the next time you open the Quantel kernel the pop-up will appear again.

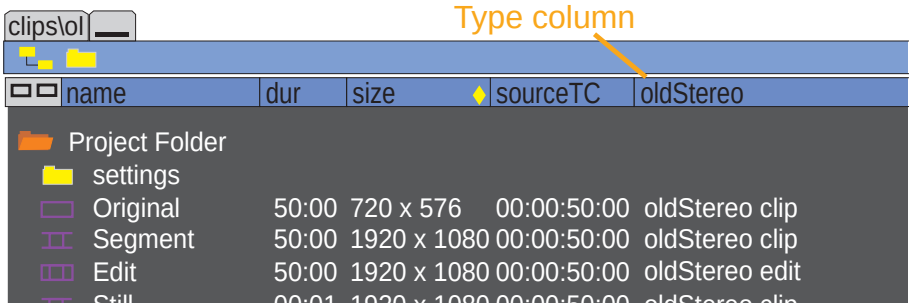
Pressing *Don't remind me again* closes the message and ensures it doesn't appear next time you open the Quantel kernel – even if there are stereo clips in a previous format.

Bin Icon Indicators

When a clip is a previous stereo format and needs to be converted to the current format (ie V5.2 or later), it is displayed with a purple icon in the bin.

Search for Previous Version Stereo Clips

You can search for all previous stereo clips in the Clips Bin by entering ‘oldStereo’ as the search term in the *Type* column.



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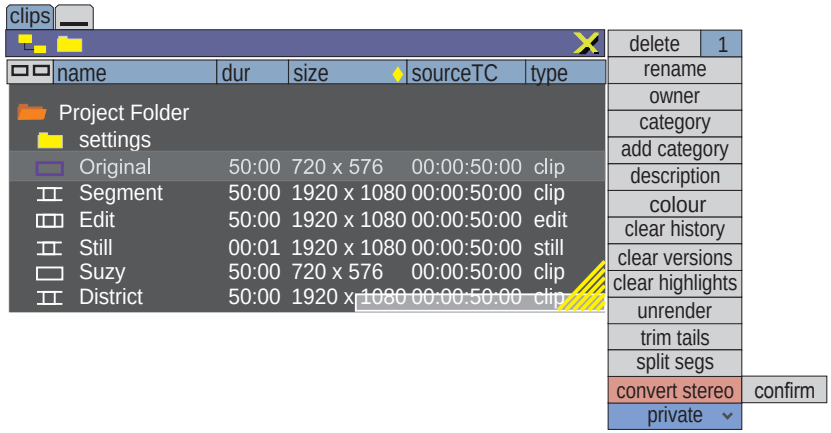
How to Convert a Clip

See 'Multiple Selection' in the Media Bins User Guide for more information about selecting multiple clips.

Convert a clip by doing the following:



1 Press on the clip title(s) in the media bin (ie Clips Bin or Server Bin).

2 Select *convert stereo*.

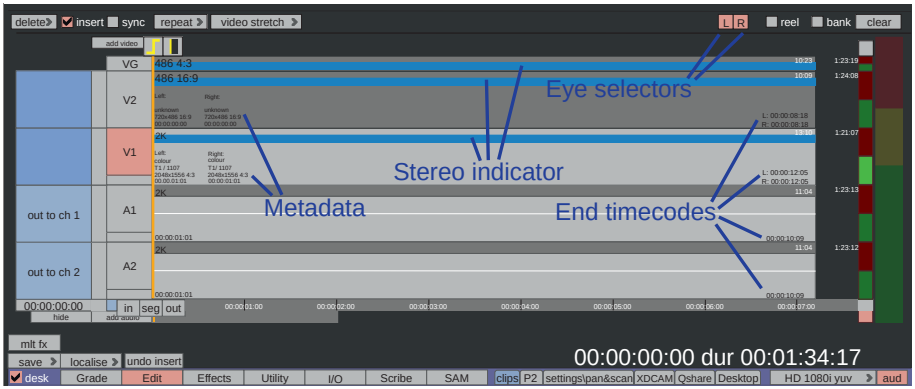
3 Press *confirm*.

Convert multiple clips simultaneously by selecting them using <Shift> or <Ctrl> then following the steps above.

Edit Application Functions

Stereo3D Timeline

A stereo clip consisting of both left and right eyes is displayed on the timeline as one layer eg *V1*. A blue line across the clip segment indicates that the clip is stereo (as in the screen shot below).



Adding Stereo Media to the Timeline

The stereo timeline can be edited, trimmed, played-out and rendered like a mono timeline. Create a stereo timeline and insert a stereo clip/edit by doing one of the following:

a Drag and drop the stereo clip/edit from a bin or the desktop onto the *Edit* button on the Application Bar.

b Drag the stereo clip from a bin or the desktop **onto** the *V1* box

c Drag and drop the stereo clip from a bin or the desktop into the Edit Window.

Any GUI (or panel) functions, eg Pan & Scan, now automatically include stereo specific functions.

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Working with Multiple Layers

You can have multiple layers of stereo clips, eg *V1, V2, V3* etc. You can also mix layers of mono and stereo clips.

Adding Layers

To add a new video layer, press *add video* above the existing layers. You can also choose to use a video guide track as a reference by pressing *VG* above the existing video layers.

See Editing User Guide for details of using a Video Guide track.

Removing Layers

To remove a layer – video, audio or VG – press *delete* in the top-left above the existing layers and then press on the layer you want to remove eg *V2*.

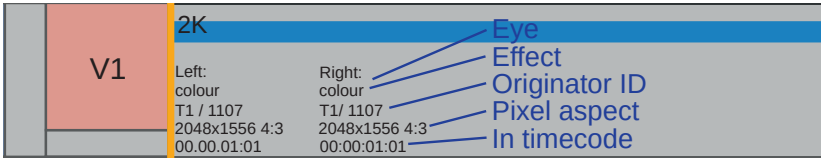
Clearing/Double Clearing the Stereo Timeline

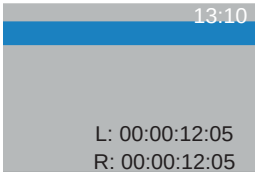
Remove the stereo edit by pressing *clear* on the right. Pressing *clear* again removes the stereo video tracks and returns the timeline to mono mode (ie only *V1* is displayed).

See the Editing User Guide for general details of adding or moving clips and other timeline functions.

Metadata Display on Timeline Segment

Metadata for each eye is displayed on the left of each timeline segment. This includes MLT FX processes (eg colour, dve, text) that have been applied to the clip, originator ID, pixel aspect, and 'in' timecode.





On the right of each segment, the ‘out’ timecode for each eye is displayed.

Show Thumbnails on Timeline

You can choose to display thumbnails on the timeline segment by selecting *Show Pics* from the *Editor* menu in the <F1> Configuration Window.

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Edit Window Display

The Edit Window image displays the words ‘left’ and ‘right’ over the current clip either side of a yellow divider splitting the image.

Pressing on the yellow divider alternates the view of the image area.

If you press once, a mix of both clips with a small vertical divider is displayed.

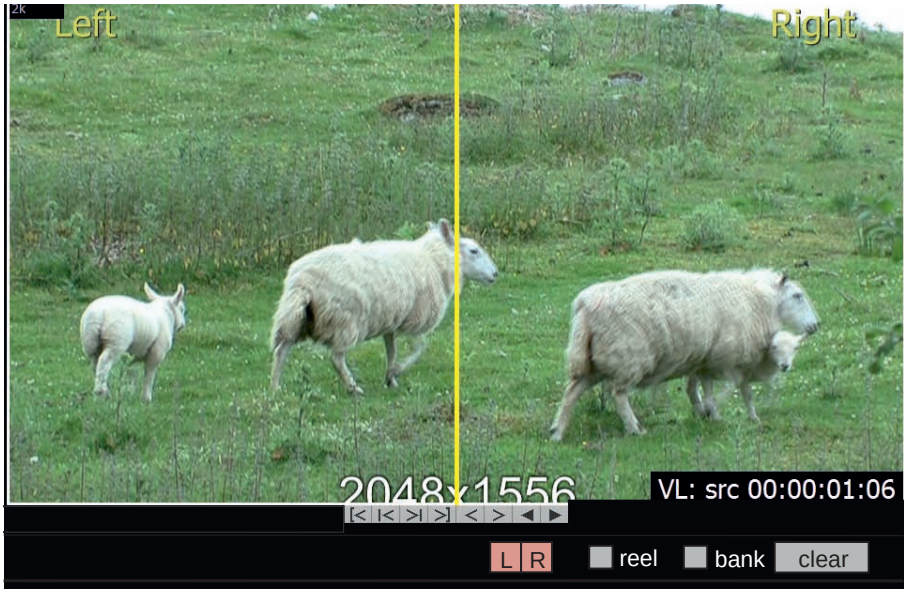
Press again and a horizontal divider appears with an emboss overlay indicating a clear view of the vergence offset.

Another press returns the view to the original vertical split.

Move the yellow divider by pressing and dragging it to the required position to reveal/hide more of the tracks.

Edit Window Eye Selection (L, R)

When you have a stereo clip loaded on the timeline, you can use eye selectors to toggle between different views in the Edit Window. The left and right eye selectors (*L* and *R*) are below the Edit Window, as shown in the screen shot. Both eyes are on by default (ie pink) and the Edit Window display is split between left and right eyes.



Deselect a button to solo one of the eyes. This allows you to see a video guide track.

You cannot mute both eyes at the same time.

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Using a Mono/Stereo Video Guide

You can add a video guide track in two ways:

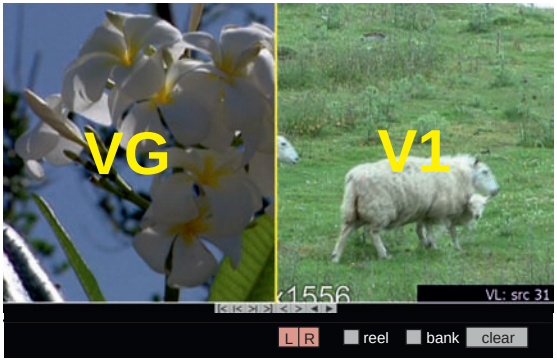
a Drag the clip you want to use as a guide, and drop it onto the *add VG* box (to the left of the timeline above existing video layers)

OR

b Press *add VG* and then drag and drop a clip you want to use a guide on the timeline with the VG track on the timeline selected.

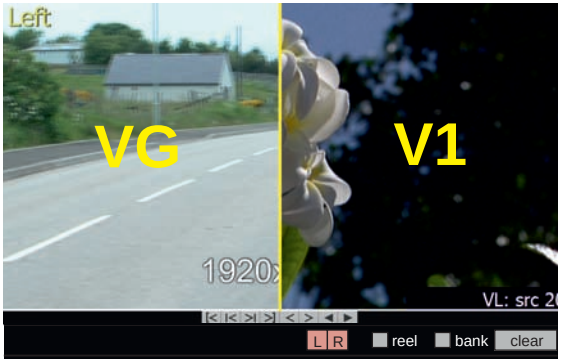
When you are using a video guide track (VG) with a stereo video track (eg V1) the Edit Window and eye selector boxes can be used as described in the following sections.

Compare V1 Stereo & VG Mono



When both eye selectors are on (default) the mono VG is displayed on the left side of the Edit Window, and the left eye of the stereo V1 is shown on the right. You can toggle the V1 eye by deselecting *L*.

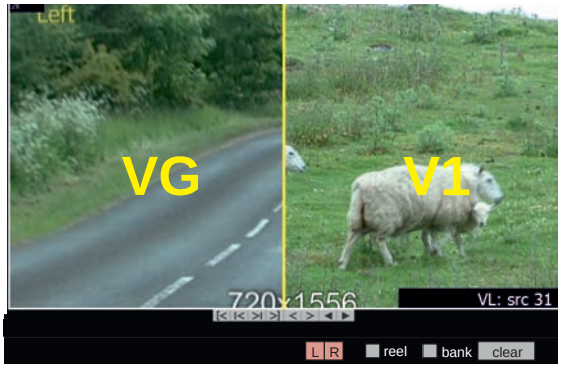
Compare V1 Mono & VG Stereo



When both eye selectors are on (default) the stereo VG's left eye is displayed on the left side of the Edit Window, and the mono V1 is displayed on the right side.

In this mode, if the Edit timeline's video track is only mono the eye selectors do not appear.

Compare V1 Stereo & VG Stereo



When both eye selectors are on (default), the stereo V1's left eye is displayed on the left of the Edit Window, and the stereo VG's left eye is displayed the right side. When you deselect *L*, both displays change to the right eye, ie the eye selectors apply to both tracks.

You cannot compare opposite eyes on different timeline or VG tracks. When comparing two stereo tracks you can either compare both left eyes or both right eyes ie not a mixture.

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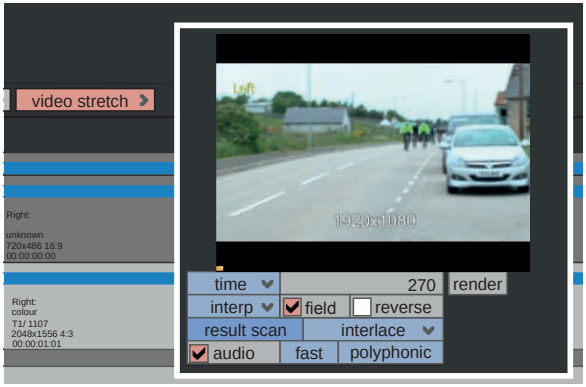
Stretching Stereo Clips

Stretching a Clip via the Timeline

You can stretch a stereo clip when it's loaded on the timeline by using the *video stretch* timeline function.

Do the following:

1 Press *video stretch*. This open a pop-up. Note that the preview window only shows the left eye, but the stretch is applied to both eyes.



2 Enter the number of frames in the *time* field (and any other options you want to apply)

3 Press *render*. (This now toggles to *abort*, which you can press to stop the video stretch.) During the render, the preview window updates.

After the render is complete, the *save* and *edit* boxes appear. When you press *save*, the clip appears in the Clips Bin with the format 'original title + stretched'. You can also press and drag the *save* box to the desktop to create a Floating Clip.

Press the *edit* box to insert the stretched clip at the current timeline position. A stretched clip is indicated with a pink line across the segment.

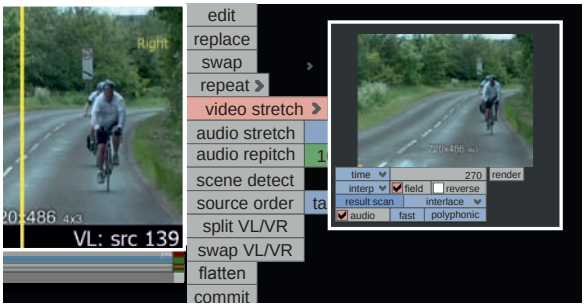
Hover over the top-right corner of the *video stretch* pop-up and press **'X'** to close it.

Stretching a Clip via the Desktop

Another way to stretch a stereo clip is via the desktop using a Floating Clip.

Do the following:

1 Hover the cursor over the top-right corner of the clip.



2 Press *more*.

3 Press *video stretch*.

4 Enter the number of frames you want to stretch to.

5 Press *render*.

After you press *render* you can choose to *abort* [the render], or when rendering is complete, select the *save* or *edit* box (see previous section).

A stretched clip is indicated with a pink line across the segment.

History is retained for mono and stereo clips.

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Vergence, Push and Pan & Scan

If you hover the cursor over the top right of the Edit window, a grey box appears. If you press this box, the Vergence and Pan & Scan menu is displayed below the image area, as shown in the following screen shot.

In addition to mono Pan & Scan functions, there are 3 extra controls when using stereo:

conv x controls the depth of 3D convergence using the X plane (ie where in the image area the objects 'sit')

conv y controls the depth of 3D convergence using the Y plane (ie for correcting vertical offsets).

push allows for reframing of the shot to avoid any edging artefacts.

These controls are realtime and are keyframed in the same way as Pan & Scan. Pan & Scan can also be applied to individual tracks.

Ensure that a single track IS NOT selected when adjusting vergence.

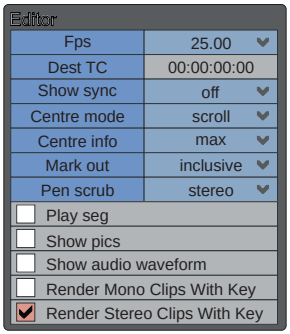
Any Vergence and Pan & Scan settings created on the Edit timeline are retained when you open MLT FX.

See 'Pan & Scan' in the Editing User Guide for more details about this function.

Rendering

Pressing the small orange box to the right of the timeline starts rendering all unrendered clip segments and transitions.

Rendering Stereo Clip with Key



To render a stereo clip with a key, select *Render Stereo Clips with Key* in the *Editor* menu in the <F1> Configuration Window.

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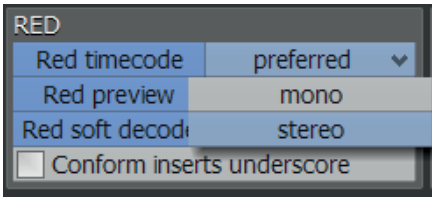
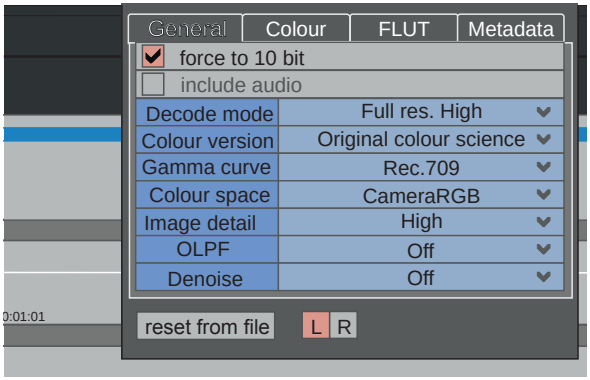
R3D Settings



To play-back soft-mounted stereo RED clips smoothly, select *stereo* from the *Red soft decode* scroll box in the <F1> Configuration Window.

With a soft mounted stereo Red clip loaded on the timeline, you can edit the settings for the left and right eye.

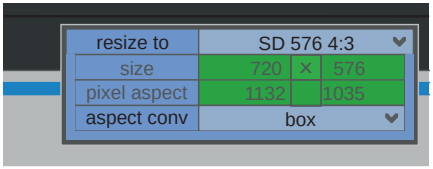
To open the settings pop-up, right-click on the stereo segment and select *r3d settings*.



In the pop-up there are *L* and *R* buttons that allow you to toggle between settings for the left and right eyes, eg when *L* is selected, only the left eye settings are displayed.

When you open the pop-up, *L* is selected by default.

When setting Red size options, the settings apply to both eyes (ie there are no *L* and *R* buttons).



Managing Eyes

Combining Eyes (from 2 Mono Clips)

You can combine left and right eye clips (ie two mono clips) via the desktop or timeline to create a single stereo clip.

Clip Requirements

The left and right eye mono clips must have some identical elements before you can convert them to one stereo clip. These include:

a Number of tracks

b Number of segments

c Total number of frames

d Number of frames per segment

e Render video information

f Size

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Combine Eyes via Desktop

To combine left and right eyes via a Floating Clip, do the following:

1 Click and drag one of the clips over the other and maintain cursor pressure.

2 Hold down <Ctrl> and <Shift> on the keyboard.

3 Release cursor pressure when a blue outline appears on the existing clip (this indicates that it is possible to create a stereo clip from the selected left and right eye clips).

If a stereo clip cannot be created, a red outline appears on the existing clip.

A warning message appears if you drop a clip on top of another with a red outline.

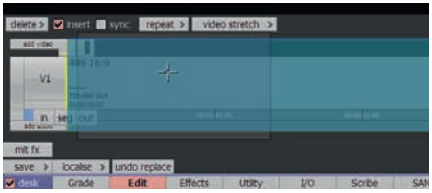
Combine Eyes via Timeline

To create a stereo clip on the timeline, do the following:

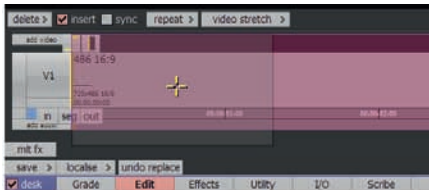
1 Drop either the left or right eye clip onto the Edit or MLT FX timeline.

2 Press and drag the other eye clip over the existing clip on the timeline – do not release cursor pressure.

3 Hold down <Ctrl> and <Shift> on the keyboard.



4 Release cursor pressure when the timeline highlights blue (this indicates that it is possible to create a stereo clip from the selected left and right eye clips).



If a stereo clip cannot be created from the selected left and right eye clips, the timeline highlights red.

A warning message appears if you drop a clip on top of another with a red highlight (see previous section).

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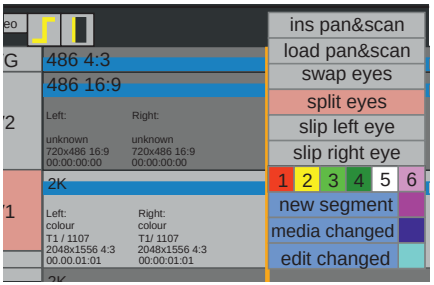
Split VL/VR Tracks via Desktop

If you drop a stereo clip on the desktop to create a Floating Clip; hover the cursor over the top-right corner of the clip and press *more*, a *split VL/VR* box appears at the bottom of the menu. This function is useful if you want to play-out or export each eye separately.

If you now press *split VL/VR*, 2 separate clips are created on the desktop with '*-VL*' appended to the clip title for the left eye, and '*-VR*' appended to the right. If the stereo clip has audio, the audio should appear on both the left and right clips.

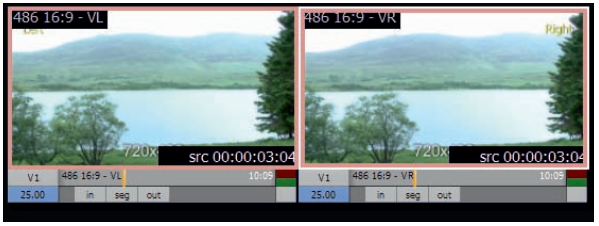
The desktop clips are locked together so you can easily save them into a bin by dragging and dropping. If you press on the desktop first then select one of the clips, they unlock.

Split Eyes via Timeline



When you have a stereo clip loaded on the timeline, you can split eyes in a segment by right-clicking on the segment and pressing *split eyes*.

Two separate clips are created on the desktop with '*–VL*' appended to the clip title for the left eye, and '*–VR*' appended to the right.



The desktop clips are locked together so you can easily save them into a bin by dragging and dropping. If you press on the desktop first then select one of the clips, they unlock.

When you split eyes via the timeline, the new clips appear on the desktop but the original stereo clip remains on the timeline.

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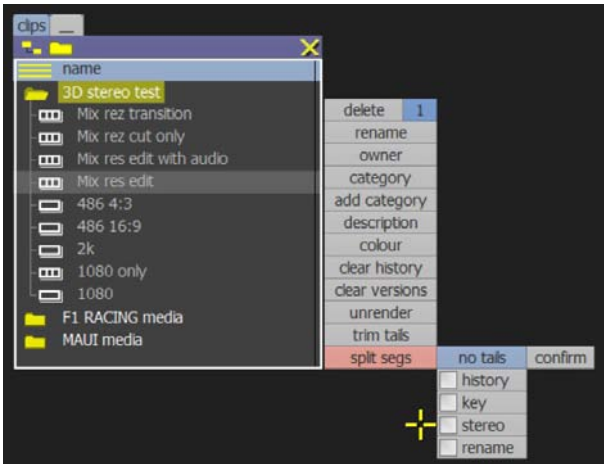
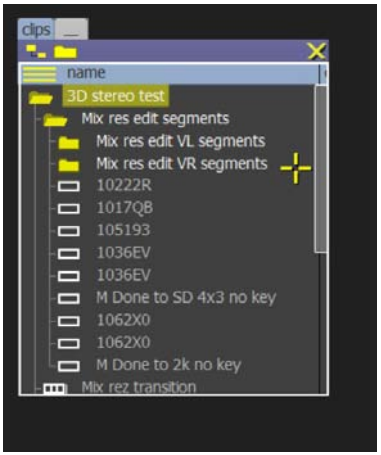
Split Segments via Clips Bin



On existing stereo clips stored in the Clips Bin, you can split any of these clips into two sub-folders of segments (one for each eye) that then also appear in the Clips Bin.

Do this by selecting the stereo clip in the Clips Bin, then from the column of options on the right, press *split segs,* tick the *stereo* box, then press *confirm*.



A new top level folder named ‘original title + segments’ now appears in the bin. Inside this folder, material is split into two sub-folders containing VL segments and VR segments.

When you split a clip that has both mono and stereo segments, the mono segments appear in the root folder with the format ‘original title + segments’, and the left and right eye segments in the sub-folders (VL and VR segments).

Swapping Eyes

When you use the 'swap eyes' function, the video and any MLT FX processes (eg colour, dve, text etc) applied to each eye are swapped.

Swap Eyes on Selected Segments via Timeline

With a stereo timeline clip, you can swap the eyes on one segment or multiple segments by lassoing from bottom-left to top-right.

To swap eyes on the timeline do the following:

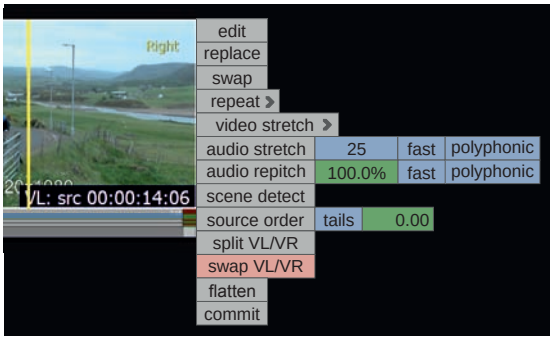
1. Select the segment(s) you want to use.
2. Right-click on the selected segment(s).
3. Press *swap eyes*.

   Video and any MLT FX processes are now swapped. This only affects the selected segment(s) and not any underlying rushes.

Swap Eyes on All Tracks via Desktop

You can use Floating Clips on the desktop to swap eyes globally through all tracks and segments of the clip and also the underlying rushes.

To swap eyes on a Floating Clip do the following:



1. Hover the cursor over the top-right corner of the clip.
2. Press *more*.
3. Select *swap VL/VR*.

   All the clip's tracks, segments and rushes are now swapped.

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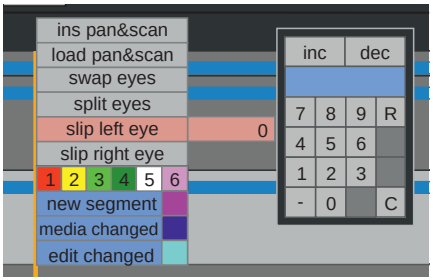
Slipping Eyes on the Timeline

You cannot use this function on clip segments that have MLT FX processes.

You can slip the stereo clip's left or right eye via the timeline. The 'slip eyes' function allows you to slip either eye forwards or backward. To slip an eye forward enter a positive number of frames; to slip an eye backwards enter a negative number of frames.

To slip an eye on the timeline, do the following:



1. Select the segment(s) on which you want to slip eyes.
2. Right-click on the selected segment(s).
3. Press either *slip left eye*, or *slip right eye*.
4. Enter the number of frames you want to slip the eye – negative or positive – in the pop-up using either the soft or external keyboard.
5. Press <Return> or click the same option you selected earlier (*slip left eye* or *slip right eye*).

Substituting Eyes

With a stereo timeline clip and a single segment mono clip on the desktop, you can replace one of the eyes on the timeline clip with the desktop clip.

The substitute eye function replaces the underlying rush of the current segment.

You cannot substitute an eye with a desktop clip that is stereo or has more than one segment.

Clip requirements

To substitute an eye of a segment in a stereo timeline clip, the desktop clip and selected segment must have a number of identical elements. These include:

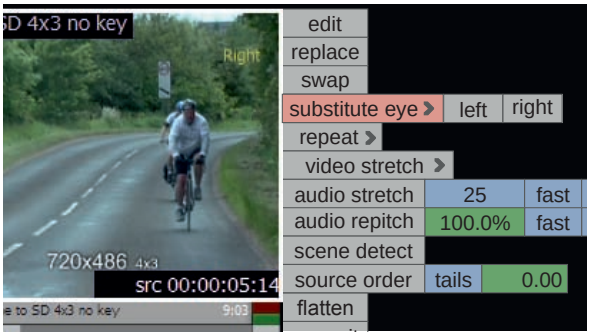
a Size

b Render video information

If the desktop clip and timeline segment don't have these identical elements or if the substitute fails for any other reason, this error message appears:

Cannot substitute eye in the selected segment

How to Substitute Eyes



1. Hover the cursor over the top-right corner of the clip.
2. Press *more*.
3. Select *substitute eye*.
4. Press either *left* or *right*.

The desktop clip now replaces the selected eye on the stereo timeline clip.

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MLT FX Functions

Working with Eye Processes

A stereo clip can be loaded on the Edit timeline and then viewed and modified in MLT FX. Any process, such as *colour, text, stereo* etc can be applied to the left eye, right eye or both eyes, while viewing a live stereo output.

Press the *mlt fx* box in the left of the Edit menu area to display all process menus; you may have to scroll down using the bar to display all processes.

Each process (except the *stereo* process itself which contains left/right functions) has two square boxes; the left one indicates a process applied to the left eye and the right box indicates a process for the right eye.

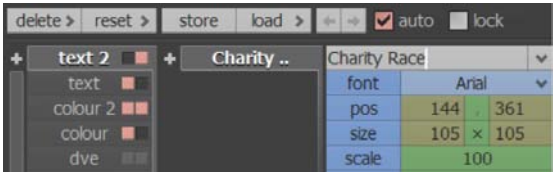
If you do not select a light-grey box next to a process, the process is applied to both eyes.

When a process has been applied to one eye, eg left, the left box turns pink and the right box turns dark-grey indicating that the right eye has no process.

You can 'mask' a process from the output by pressing the pink box; the box then turns back to light-grey.

The boxes in this screen shot indicate that there is a DVE process on the right eye, a left eye colour correction and a second colour correction on both eyes.

If a large number of processes are set-up, the MLT FX player may not play-back stereo in real time.



The process menu on the left indicates a colour correction on the left eye, a second colour correction on both eyes and the same text on both eyes, but slightly offset on the right eye to 'bring it forward' on screen.

This is the image result.

You can change the division or view each eye individually in the Edit Window; see 'Edit Window Display' previously in this chapter for details.

Apply a Process/Additional Process to One Eye

To apply a process to one eye:

1. Press the left or right light-grey box next to the process.
2. Apply the process, eg make a colour change. The selected box now turns pink.

To apply an additional process of the same type to the other eye:

1. Press the '**+**' box to the left of the process menu to add a second process of the same type, eg *colour 2*.

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2 Press the light-grey boxes next to the new process to toggle between left, right and both eyes.

3 Apply the process, eg make another colour change. The selected box now turns pink.

Selecting One or Both Eyes

Click once on a light-grey box to select an eye, click again on the same box to reselect both eyes.

Toggling a Process to the Other Eye

Click and hold a dark-grey box to toggle the identical process to the other eye.

Duplicating a Process to the Other Eye

Click and hold a pink box to apply the identical process to both eyes.

Using the Stillstore & Storyboard

Storing & Transferring Multiple Processes

With stereo clips, whenever multiple processes of the same type (eg *colour, colour 2, colour 3, colour 4;* or *dve, dve 2, dve 3, dve 4* etc) are added to the Stillstore or Storyboard, all processes for left, right or both eyes are stored and subsequently recalled. The tile in the still store and story board only shows the left eye.

The Storyboard reel image is always the frame of the timeline position when leaving the segment. It is this frame that is used as the reference wipe image.

See MLT FX User Guide for how to use the Stillstore and Storyboard for selective process transfer.

Stereo Display Modes

In *Normal* mode in MLT FX, tapping on the yellow divider on the image area toggles between vertical and horizontal modes; this is slightly different to the Edit divider which has more modes.

As well as the left/right, top/bottom and half mix viewing modes, there are additional modes for viewing stereo.

These are *Normal, Half Mix, Diff, Chequerboard, AnaglyphCol, AnaglyphMono,* and *Flicker* modes. These are selected via the scroll box next to the transport controls (see above screen shot). The yellow divider on the image area disappears if any of these modes are selected.

You can disable the main output in all the viewing modes. To toggle the main output on or off press *Main* to the right of the viewing mode scroll box under the Edit Window. The main output is on when the button is selected (ie pink).

This example shows *AnaglyphCol* (colour) mode; this can be viewed with anaglyph glasses.

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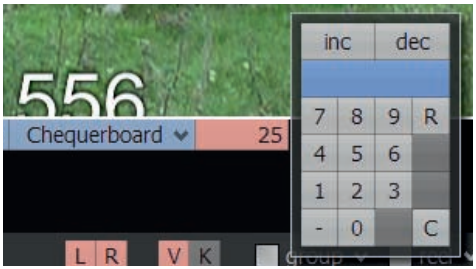
Here is the same image in *Diff* (mono difference) mode which clearly displays the left/right eye disparity.

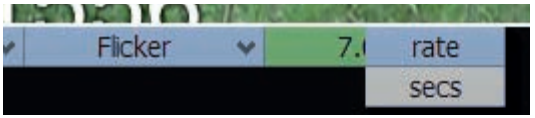
The *Chequerboard* mode is useful for seeing and correcting colour differences between the 2 eyes.



You can change the chequerboard size by entering the number of horizontal squares required in the green box to the right of the viewing mode scroll box.

The *AnaglyphMono* mode is an alternative mode for viewing the disparity between the 2 eyes. It makes it easier to identify the separate eyes; left eye = red and right eye = cyan.

The *Flicker* mode alternates (flickers) between left and right eyes making it easy to see and correct any geometry errors.



You can adjust the flicker rate in numbers per second or fractions per second by doing the following:

1. Select *rate* (numbers per second) or *secs* (fractions per second) from the blue scroll box to the right of the viewing mode under the Edit Window.
2. Enter the required number in the green box to the left of the *rate/secs* scroll box.
3. Press <Return>.

***Flicker* mode is linked to the main output on stereo enabled machines.**

Display Mode During Playback

When a stereo clip is playing in MLT FX, the display mode returns to *Normal* temporarily while playing, regardless of whether any other mode (eg *Chequerboard*) has been selected.

Stereo Process

In addition to the general MLT FX processes such as *dve, colour* and *text* that you can use on stereo media, there is a separate *stereo* process to assist with stereo specific issues. From the process menu on the left, press *stereo*. The functions available are described below.

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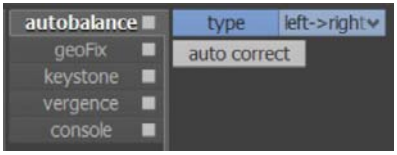
Autobalance



Any colour mismatch between the 2 eyes can be automatically corrected using *autobalance*. Compare the histograms of the 2 images and then correct using separate R, G, B lift, gamma and gain values.

From the *type* scroll box, select one of the following:

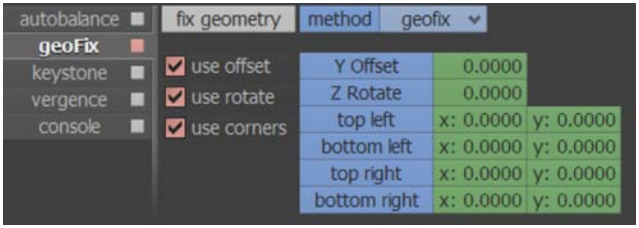
left->right balances the right eye to match the left (ie settings from the left to the right)

right->left balances the left eye to match the right (ie settings from the right to the left)

mix balances both eyes to meet in the middle.

When you've made a selection, you can select other clip segments then press *auto correct* to apply the selection to these segments. Autobalance affects RGB lift, gamma and gain and always affects the original input (source) images, so is always first in the process chain regardless of the position of *stereo* in this chain.

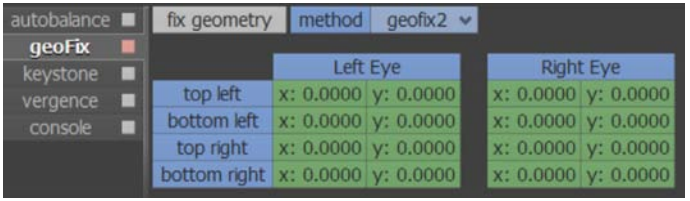
GeoFix & GeoFix2



The *geoFix* function automatically fixes stereo geometry errors between the left and right eyes.

If you select *geofix* from the *method* scroll box, tick the required offset, rotate or corner options, then press *fix geometry,* an image analysis is performed and a correction then applied to the right eye to match the left, based on which functions have been ticked, ie offset (vertical alignment), rotation and/or corner pinning.

All geoFix values are now displayed in the green numeric boxes. These values are keyframeable and can be manually adjusted as required.

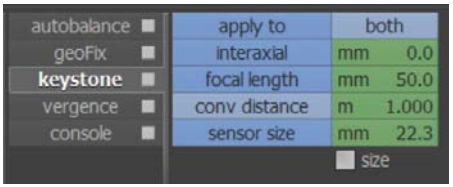


To use advanced image analysis, select *geofix2* from the *method* scroll box.

GeoFix2 uses advanced image analysis techniques and applies corrections to both eyes to fix stereo geometry precisely and without compromising quality. As with geoFix, all geoFix2 values are displayed in the green numeric boxes. These values are keyframeable and can be manually adjusted as required.

When geoFix2 undertakes advanced image analysis, there may be a short delay while the images are analysed.

Keystone



In a convergent camera rig, the images produced contain keystone distortion that should be fixed via the *keystone* function to avoid stress to viewers' eyes.

This is a front end process that occurs before any other creative adjustments.

In the *stereo* menu, keystone adjustments can be made to the left or right eyes separately or to both as a pair. With *both* selected from the scroll box, the interaxial distance is the total combined left and right interaxial distances.

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With *left* or *right* selected from the scroll box, it is still the total interaxial distance but with the assumption that the other eye is perpendicular to the screen plane.

The *size* box when ticked, resizes the images to remove any edge artefacts introduced as part of the keystone correction.

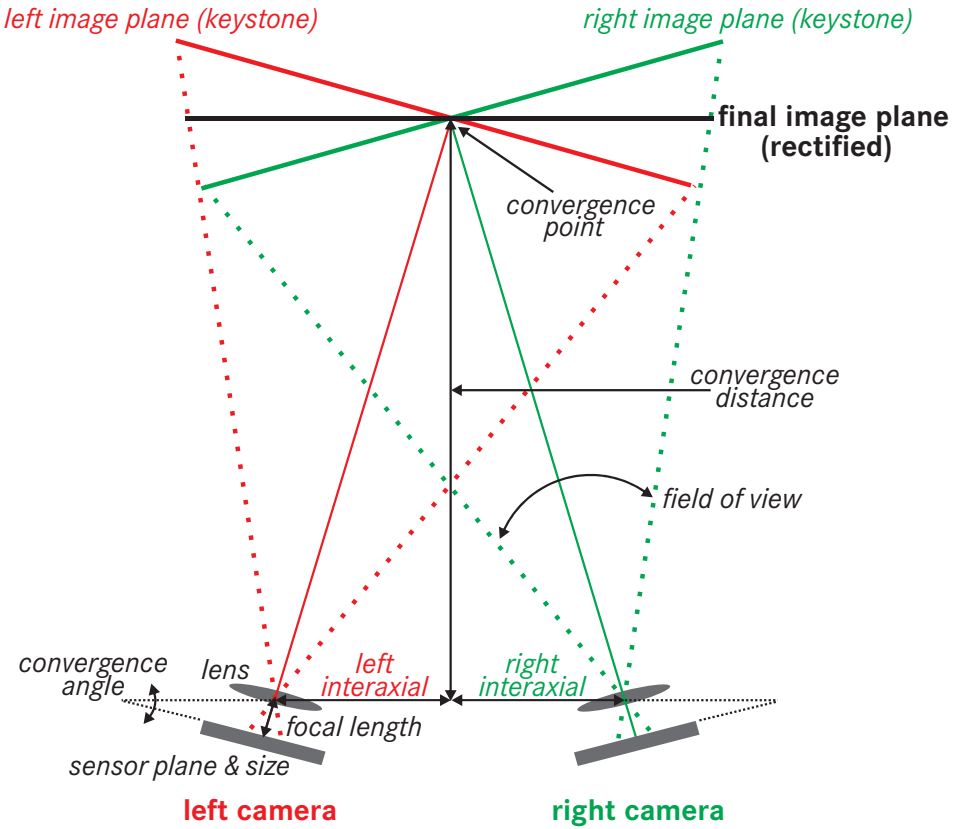
With a limited amount of geometric information, the process calculates proportionate adjustments to corner pin positions to correct the left/right eye image distortions. It is assumed that:

a the distortion is in the horizontal plane only

b the image vertical centre line is the convergence point of the optical path

c measurements of interaxial, focal length, sensor size, and convergence point are available

d the effective object plane is parallel to the interaxial plane.



Note that in a real system the interaxial distance would be measured from a point behind the lens. In the previous diagram, the simplification reduces the lens to a pin hole camera.

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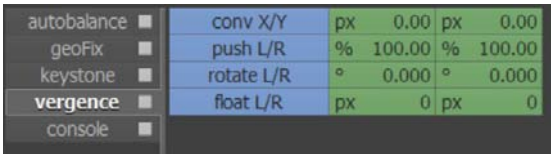
Vergence

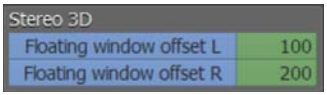


You can use *vergence* to 'burn-in' any X and Y offset corrections made as a result of depth balancing a series of shots.

You can enter pixel values for each eye using the *conv X/Y* controls and percentage values for *push L/R* (this zooms the image so that the shot is reframed therefore avoiding any edge artefacts). The two *rotate L/R* boxes allow rotational correction of the left/right eyes to a minimum of 0.1 of a degree to be performed.

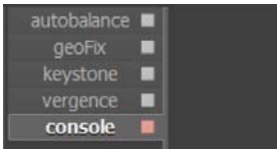
If you press on a blue conv, push or rotate label box and drag the cursor in a circular motion (or tap once to display the number pad), both eyes are 'locked' together for that function and both values in the two green boxes adjust simultaneously. When rotating, the left and right eyes rotate in opposite directions to each other. Note that during this 'lock' process, any offset between the eyes is maintained if an adjustment has previously been made to one eye only.

The *float L/R* controls allow the creation of 'floating windows' that reduce the visibility of edge borders and artefacts. This avoids 'pushing' or 'zooming' the image unnecessarily. A positive pixel value crops the left edge of the left eye together with the right edge of the right eye. A negative value crops the opposite edges.

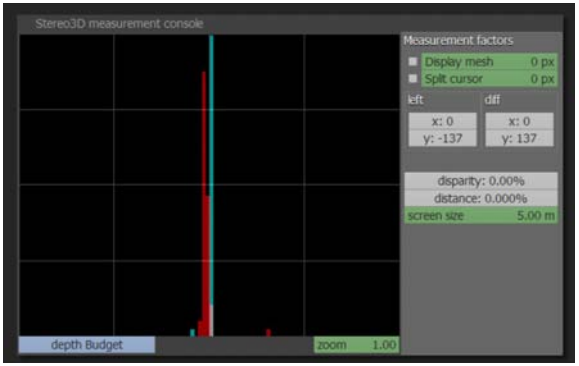


You can set a left and/or right eye default float offset via the <F1> window, shown in the screen shot. If you now enter a float value via the *vergence* menu, this value plus the default offset in the <F1> menu is applied to that eye.

Console



When you press the *console* box, a floating measurement console window appears above the menu area. These measurement tools interact with the current clip image.



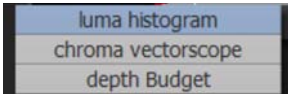
By pressing on any point in the clip image, the measurement tools will analyse the selection and provide the x and y positions of each eye in pixels, plus the *disparity* and *distance* in or out of the screen as a percentage.

As the *distance* value is directly related to the size of the viewing screen, you can change the *screen size* value, which then adjusts the *distance* value accordingly (in proportion to the screen size).

With the console displayed, pressing <Alt> + tapping with the cursor (or right-clicking with the mouse) in the image window automatically sets the horizontal disparity to '0', therefore adjusting the vergence so that the point clicked is placed on the screen plane.

Ticking *Display mesh* displays a mesh over the output image, indicating the screen plane. You can move this mesh in z space (ie in or out of the screen) by changing the numeric values to the right.

Ticking *Split cursor* displays 2 anaglyph cursors on the output image; red for the left eye and cyan for the right eye. By placing these cursors over corresponding points on the left and right eyes, you can discern the disparity (to a pixel) of any object within a stereo image. With the *Split cursor* value set to 0, tapping on the stereo image itself will automatically adjust the split cursor for the vergence at that point. Any other value overrides this, fixing the split cursor vergence value wherever the cursor is placed within the image.



From the scroll box in the bottom-left of the console, you can either display a luminance histogram, a chroma vectorscope, or a depth budget graph in the console window:

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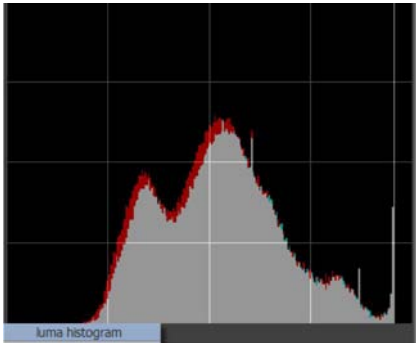
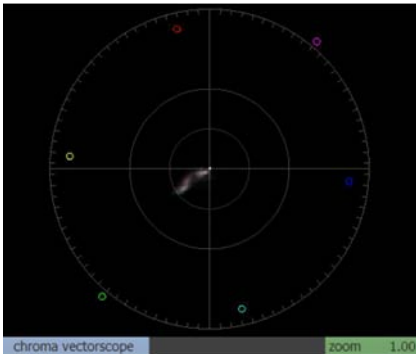


Selecting *luma histogram* displays the luminance of each eye as an anaglyph overlay. White indicates where the luminance of each eye matches the graph. Any point where the luminance is higher for an eye is indicated in red for the left (eye) and cyan for the right.



Selecting *chroma vectorscope* displays a chrominance overlay in anaglyph of the two eyes. The left eye is indicated in red and the right eye in cyan. You can zoom-in on the scope by changing the *zoom* value in the green box on the bottom-right.

Selecting *depth budget* displays the amount of out-of-screen (negative parallax), on-screen (zero parallax) and in-screen (positive parallax) a stereo image has. The central line is the screen plane with negative parallax moving to the left and positive parallax moving to the right.

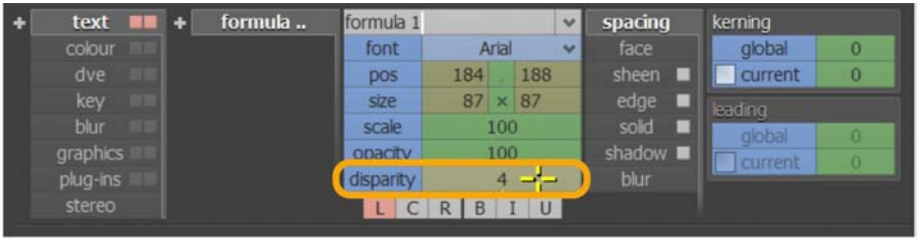
Red lines indicate x axis parallax and cyan lines indicate y axis parallax.

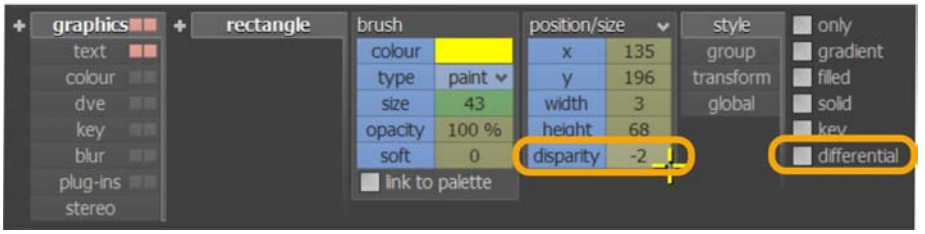
You can press any empty area of the console graph window and drag it to a new position if required. Press the '*X*' in the top-right corner of the window to close it.

Disparity

Text & Shapes

If you create stereo text using the MLT FX *text* process (see first screen shot below), you can change the *disparity* value in the menu, which controls negative or positive parallax of any stereo text object. For example, entering -5 pixels applies negative parallax, appearing to bring the text forward of the screen.





Similarly, whenever a stereo vector shape such as a circle or rectangle is created in any process, eg *graphics, blur, colour, key* etc, you can adjust the *disparity* value for that shape via the numeric box (see second screen shot showing the *graphics* menu). On shapes, you can also use the *differential* tick box with the *disparity* function as follows:

differential **ON** — disparity adjusts each eye equally in opposite directions relative to the position of the original shape.

differential **OFF** — disparity adjusts the right eye only. This enables you to draw a shape accurately around the required area on the left eye, which then remains in position while the right eye disparity is adjusted.

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Image (DVE)

When you have a stereo clip loaded on the timeline, you can change the *disparity* value in the *dve* process menu.

This controls negative or positive parallax of the left and right eye view. For example, entering -20 pixels applies a negative parallax, appearing to bring the image forward from the screen plane.

Negative disparity **0 disparity** **Positive disparity**

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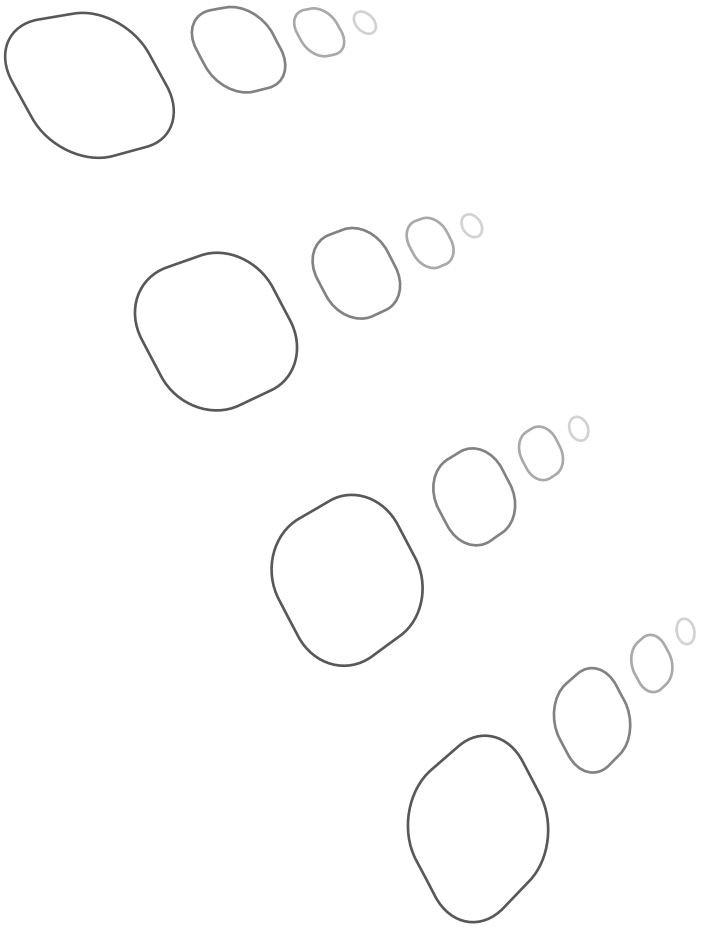


2

Panel Functions

Stereo functions that fully interact with the GUI are available on the Neo and the NeoNano panels.

These panels are mostly used for colour correction; see the Grading User Guide for details of all the panels' functions.

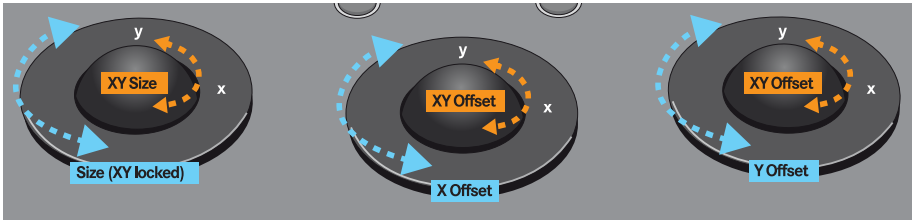
Neo & NeoNano – Edit

Where not specified, functions in this chapter are located across the Primary Grading Area on the Neo Panel, and across the whole panel on NeoNano.

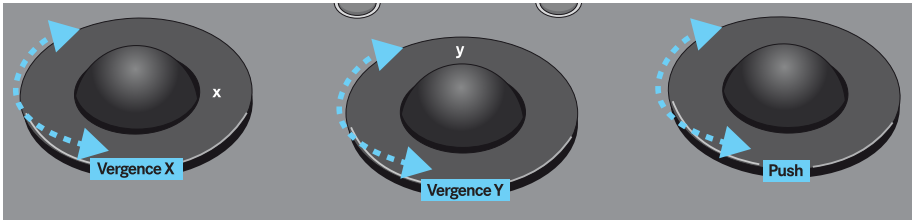
Pan & Scan Mode

Roller Ball & Ring Functions

With MLT FX closed, turn Pan & Scan on by pressing the **Pan + Scan** panel rotary knob to 'on'. The panel OLEDs now display applicable mono or stereo functions, depending on the current clip. Some of the panel's button functionality now changes (see next section) in addition to the following roller ball functionality:



With Stereo3D media, a **3D Control** OLED/rotary knob automatically appears. Press this to 'on' which changes functionality as follows:



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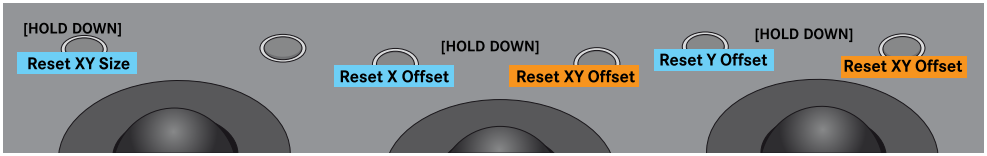
Button Functions

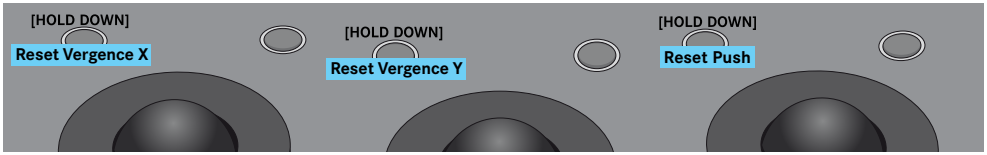


You can do the following on the buttons indicated in this diagram:

hold down reset Pan & Scan size/offset.

With the **3D Control** rotary knob 'on', you can do the following on the buttons indicated in this diagram:

hold down reset vergence/push.



In this mode, the panel's global **bypass/reset** button can also be used as follows:

press resets Pan & Scan
hold down deletes Pan & Scan keyframes.

See 'Pan & Scan' in the Editing User Guide for more details of GUI functions.

OLED Display & Rotary Knob Functions

Edit menu: 'Pan & Scan'. Note that MLT FX must be closed. Panel functions that appear automatically with a Stereo3D clip are indicated below in an orange block. The rotary knobs and OLEDs are used as follows (from left to right across the panel):

	Size X 1.000	Size Y 1.000	Offset X 2.250	Offset Y 3.000	Vergence X 0.000	Vergence Y 0.000
turn	adjust x size	adjust y size	adjust x offset	adjust y offset	adjust x vergence	adjust y vergence
press						
<Ctrl>+ press						
hold down	reset x size	reset y size	reset x offset	reset y offset	reset x vergence	reset y vergence

	Push 1.000			3D Control Off On	seg track	Pan + Scan On Off
turn	adjust push				apply Pan & Scan to current seg or track	
press				3D panel ring functions on/off		Pan & Scan panel & GUI functions on/off
<Ctrl>+ press						
hold down	reset push					

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Neo & NeoNano – MLT FX

Selecting/Enabling Eyes

In MLT FX, the 'track' OLED indicates numbered stereo (and mono) timeline tracks that you can control with the corresponding rotary knob as follows:

turn	select track
press	mute track/show track
<Ctrl> + press	toggle between track FX/seg FX
<Shift> + press	toggle between L, R, L & R eyes
<Shift> + <Ctrl> + press	toggle between L, R eye
hold down	delete current track.

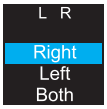
With stereo media in MLT FX, the L and R at the top illuminates (they are greyed-out with mono media). This allows you to mute/solo an eye on the current track by holding down <Shift> then pressing the 'track' rotary knob to toggle between L , R, or back to L and R (see screen shot).

Alternatively, hold down <Shift> and <Ctrl> then press the 'track' rotary knob to toggle between L or R only (not L and R together).

Each *L* or *R* box (below the GUI Edit Window) and on the panel display turns pink when an eye is enabled, and the Edit Window image updates accordingly.

Note that both eyes are displayed in the Edit Window and on the output by default. You cannot mute both L and R together.

Applying Eye Processes



With stereo media in MLT FX, you can insert processes (eg colour) on the left eye, right eye or both eyes via the panel.

Press <Ctrl> and the **solo layer** button to switch the 'track' rotary knob to MLT FX 3D mode (press this later to return to normal track mode):

1. Choose the process or menu you require either from the panel or by selecting the process in the GUI, eg *colour*.

2. Turn the rotary knob to the required track eg Right, then push and hold it to set the process for only the right eye.

3. Perform the required process changes; notice the GUI now displays a pink box for the right eye to indicate a change has been made.

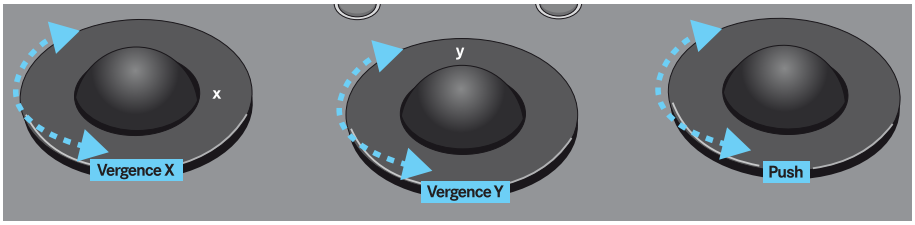
4. While still within the same process (*colour* in this example), you can now choose the left eye via the track selector knob; a second process (*colour 2*) now displays in the GUI above the first one. Perform the changes as required and if necessary create a third process for both eyes.

You can now use the rotary knob to move between processes. If more than 3 processes are created, only the first Left, Right or Both process in the stack can be selected via the panel knob; to select subsequent processes, eg *colour 2, colour 3,* use the GUI.

Vergence Menu

Ring Functions

You must have stereo media loaded on the timeline and *stereo – vergence* selected in MLT FX. The panel ring functionality changes as follows:



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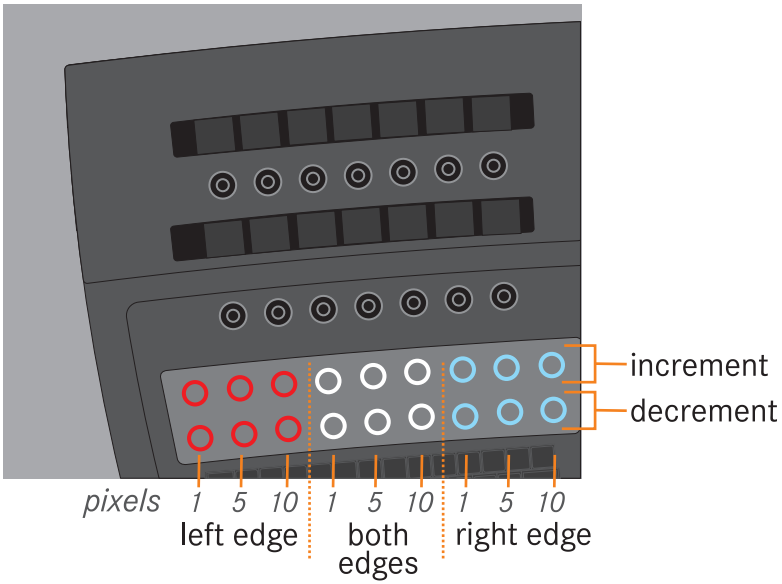
Button Functions (Neo only)

With stereo media loaded on the timeline and *stereo – vergence* selected in MLT FX, these 'float' functions illuminate across the Neo panel's Secondary Grading Area, as shown in the following diagram. These buttons provide an accurate way of adjusting float values in 1, 5 or 10 pixel increments.



For details of using all functions on the Neo or NeoNano panel (including colour, dve etc) see the Grading User Guide.

OLED Display & Rotary Knob Functions

MLT FX menu: *stereo - vergence*

You must have stereo media loaded and *vergence* selected in MLT FX. The rotary knobs and OLEDs are used as follows (from left to right across the panel):

	conv X 0.000	conv Y 0.000	push LR	push L 100.00	push R 100.00	float LR
turn	adjust x vergence	adjust y vergence	adjust push LR	adjust push L	adjust push R	adjust float LR
press	x vergence off/on	y vergence off/on	push LR off/on	push L off/on	push R off/on	float LR off/on
<Ctrl>+ press						
hold down	reset x vergence	reset y vergence	reset push LR	reset push L	reset push R	reset float LR

		float L 0	float R 0	rotate LR	rotate L 0.000	rotate R 0.000
turn		adjust float L	adjust float R	rotate LR	rotate L	rotate R
press		float L off/on	float R off/on	rotate LR off/on	rotate L off/on	rotate R off/on
<Ctrl>+ press						
hold down		reset float L	reset float R	reset rotate LR	reset rotate L	reset rotate R

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3

Stereo I/O

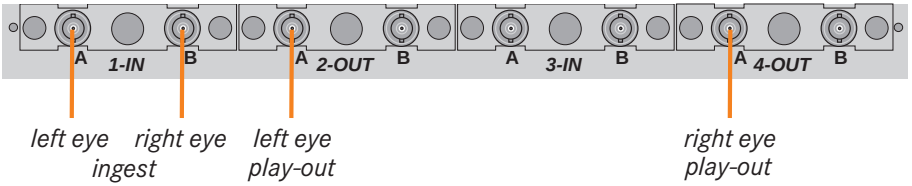
On Quantel workstations, the I/O application provides stereo ingest, conform, export, play-out and archive functions.

On sQ Server systems, sQ Record and sQ Play are used for stereo ingest and play-out: see sQ Play or sQ Record User Guide for details.

I/O (8U Workstations Only)

SDI In & Out Connections

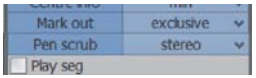
With stereo media on 8U workstations, ensure that the SDI inputs and outputs on the workstation are connected as described below.



Both the A and B outputs from the VTR must be connected to the same SDI input pair on the workstation, eg *A+B 1-IN* respectively (or alternatively use *A+B 3-IN)*. On stereo play-out, the left eye plays on the GUI and on the second monitor both eyes play together.

Controlling Output

Pen Scrub Option



The *Pen scrub* box in the <F1> Configuration Window's *Editor* menu controls how a stereo clip is sent to the outputs during pen scrub/spooling on Pablo systems.

With *stereo* selected, both outputs display VL and VR, providing stereo output while spooling/scrubbing. To prevent eye fatigue, you can select *monocular* instead. In this mode the track being scrubbed (ie the one touched with the pen) is sent to both outputs.

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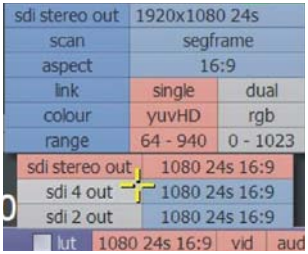
Setting Output Format



The blue 'output format' box on the right of the Application Bar shows the specific output/play preview format currently being used.

The same resolution and frame rate are used on both active outputs; they are locked together by using the single *sdi stereo out* control.

Play-out Separate Tracks

The *split VL/VR* box on a stereo Floating Clip can be used if you want to play-out each eye separately.

See 'Managing Eyes' in chapter 1 for more details.

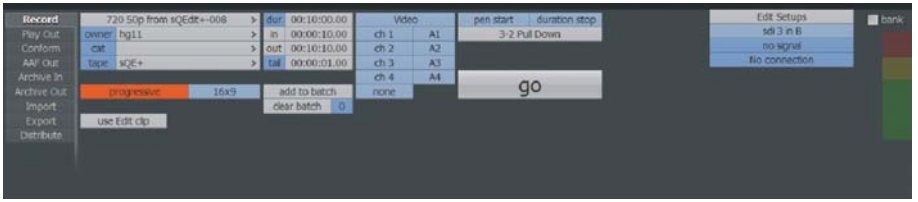
I/O Application Functions

The I/O application can be used to ingest, conform, play and archive stereo media. Most menu functions are used in the same way as for mono media; these are described in the I/O User Guide. Any stereo specific options are described below. To start the I/O application, press the *I/O* tab on the Application Bar.

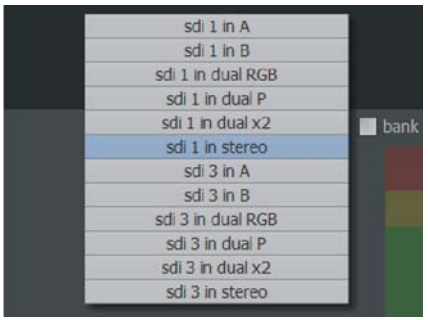
See the I/O User Guide for details of general menu functions.

Stereo Ingest

Check that the VTR has the correct connections and settings, then start the I/O application.



Select the *Record* menu.



From the scroll box on the right below *Edit Setups*, select either *sdi 1 in stereo* or *sdi 3 in stereo*, depending on the workstation IN connection (see previous section). Press the *go* button.

The stereo clip now records into the Clips Bin. Drag the recorded clip from the bin onto the desktop to create a stereo Floating Clip

You can use the *more – swap/replace* functions if required to place the clip on the Edit timeline for editing etc.

Stereo Conform

In the I/O application's *Conform* menu, it is possible to conform from single HDCAM SR tapes containing stereo rushes to create stereo conformed clips, and have modified archive to allow these clips to be archived with 'minimum media' (ie the archive refers to the source tapes).

Stereo segments are created automatically if the corresponding sources are stereo ie Cineform or stereo tape deck.

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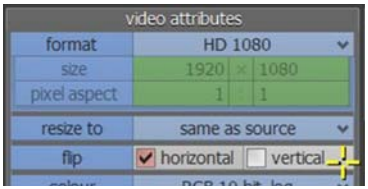
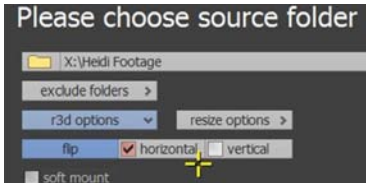
Flipping File Sequences on Import & Conform



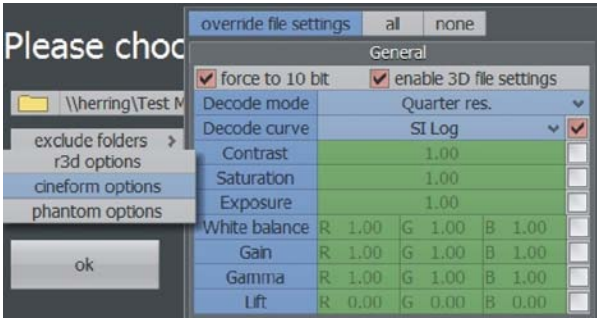


You can flip file sequences vertically and/or horizontally by ticking the *Import* or *Conform* menus' *flip – horizontal/vertical* boxes. By doing this, you don't have to use the *dve* process later to flip the left or right eye. Note that you cannot do this with soft-mounted media.

Stereo Reference Clip Options

You can use stereo clips/edits as references during the conform process. To do this, drag a clip/edit from a bin onto the Conform main window and it will be added as a reference into the same area as a mono reference. Then you can choose whether you want to use the settings from both eyes or either eye from the *VL/VR* scroll box (see screen shot).

Cineform (AVI & MOV) Files



Cineform mixed stereo files containing 2 image streams (.avi and .mov) can be conformed from a single layer AAF to produce a stereo master. In the *cineform options - General* decode menu, tick *enable 3D file settings* and set other required parameters before starting the conform.

See the I/O User Guide for details of using *Conform, Archive, Export* and other menus.

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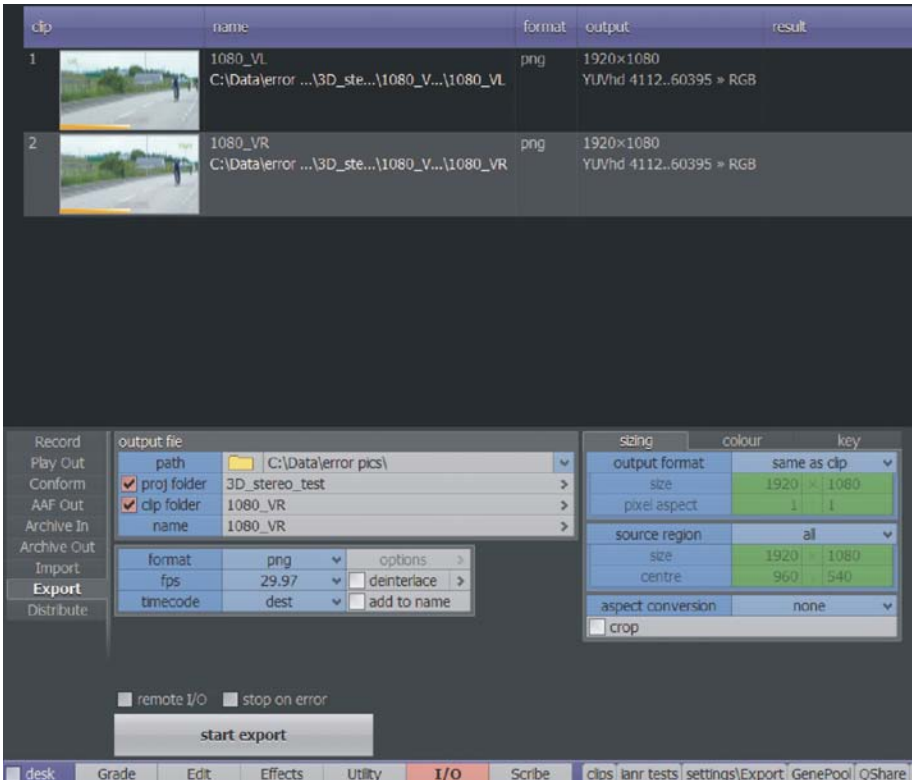
Stereo Export

In the I/O application's *Export* menu, stereo clips can be exported as separate file sequences with VL and VR tags by ticking the *split VL/VR* box on the right of the menu (this is the default state).



When a stereo clip is now dropped onto the *Export* menu's desktop it is split into left/right eye clips; one with a VL tag and the other with a VR tag. By selecting the *clip folder* and *proj folder* tick boxes (shown above) the separate left and right eye clips will then be placed into their corresponding folders.

If you deselect the *split VL/VR* box, any stereo clip that is exported will automatically be converted to a single side by side (ie divided vertically through the centre) file (mov, wmv, avi etc) or a sequence of side by side files (dpx, jpg, tga etc).

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Note that main entries starting with a lower case letter may indicate a sub-menu or panel function (eg **hue**).

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